Looping: Garage Band 3 and Acid Music Studio 6

October 2006

Volume 19 Number 10

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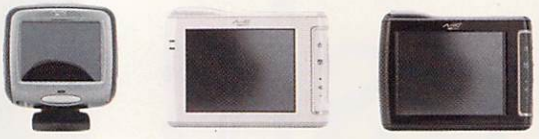

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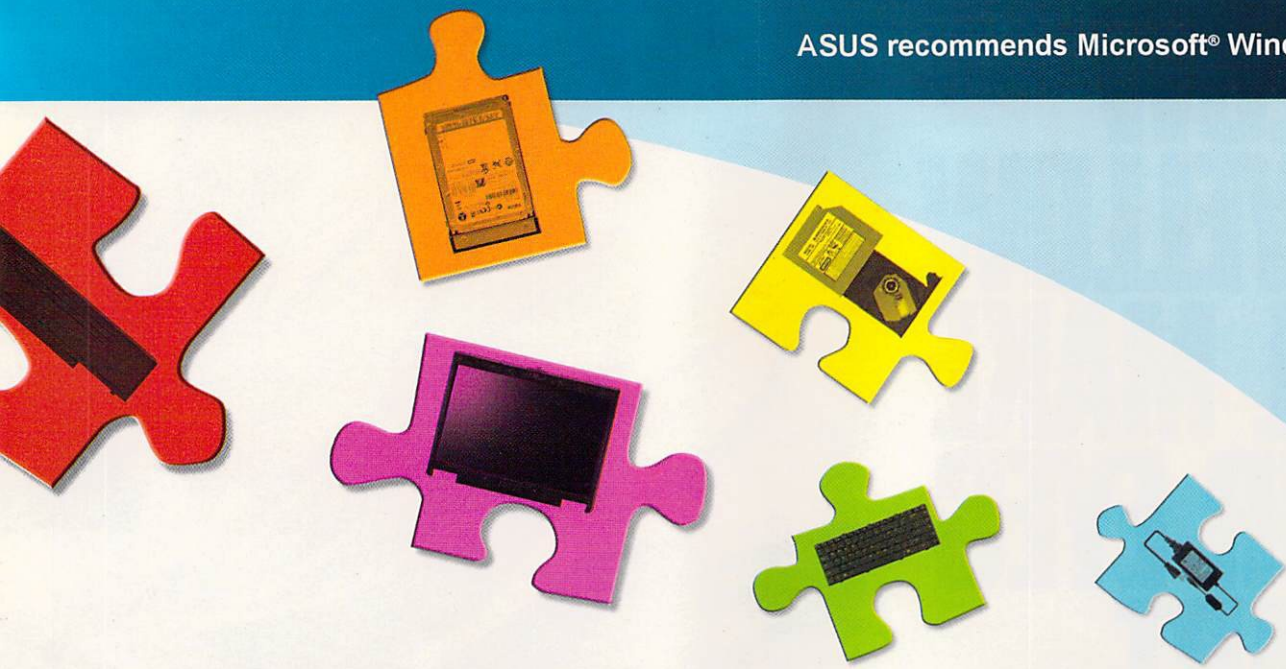

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Editorial

Digital technology is an adult

A recent email I received announced the 10th anniversary of Flash. That little program has done amazingly well, going from a nifty animated GIF alternative to its own immersive universe. Although it's often reviled as a major contributor to Web bloat, whether you love or hate Flash, you can't deny its impact on the Web.

Two other big deal digital technologies are celebrating significant anniversaries this year. The hard disk drive is now 50 years old. IBM introduced the first one in September 1956. The IBM 350 Disk Storage Unit could store five megabytes of data – a breakthrough in its day, but useful today only for one or two MP3 tunes or a single high-res digital photo. Today we find tiny-huge hard drives everywhere – in music players and video camcorders as well as computers.

And speaking of computers, the IBM-PC is 25 years old this year. The IMB-PC, introduced in August 1981, wasn't the first mass market personal computer, but it soon became synonymous with the term PC and its family tree leads directly to today's machines (at least the non-Mac ones). The IBM-PC chaperoned the first serious date between what have become the industry's power couple: Intel and Microsoft.

Ironically, IBM isn't in the PC hardware biz any more, strictly speaking. It sold its PC group to Chinese computer maker Lenovo in 2004 – although at the time also took an 18.9 percent stake in Lenovo.

Humans go from birth to adulthood in 25 years, which means that there is now a generation that has never lived in a world without personal computers. And what of the 25 year old PC – has it reached adulthood? In fact, the IBM-PC was born an adult – or at least born to serve adult business concerns. The frivolous joy of experimenting with things like art was left to the earlier Apple IIs and later Macs. No wonder, then, that Macs remain popular with artists, musicians and other right-brain types.

Today, of course, Macs and PCs do many things equally well. But one thing about the Mac vs. PC battle has not changed – it is still about mindshare.

Apple maintains a position as one of the top five personal computer manufacturers or close to it, but in a sea of Windows machines, that translates into a global market share for Macs of about five percent. Nevertheless the Mac remains a bigger phenomenon than a five percent share would predict. Apple has always used some variation of "the cool computer" to market the Mac, and it's still at it – witness the recent "I'm a PC, I'm a Mac" TV spots.

When I see those ads I think maybe I should get a life and get a Mac full time, but in reality, I'm pretty happy with all the things I can do with a Windows PC. This month's focus on audio is a case in point. In working through similar music applications, GarageBand for Mac and Acid Music Studio for Windows, I found that I could do the same things in either, and in some cases, Acid was slicker. Was it just my imagination then, or is every Mac surrounded by that Jobs reality distortion field – because I swear, using the Mac somehow seemed cooler.

Enjoy the issue

David Tanaka
Editor-in-Chief

Contents

October 2006

Home recording studio primer 2
Audio file formats explained 10
Moving to Mac 14
Vista Watch: Windows Media Player 11 16
The secret to buying audio gear 20
iPod: The Next Generation 25
Capturing the family hijinks in high def 26
Fill 'er up! Tunes for you iPod 28
Going loopy over loops 33
Team work in Word 34
DV, or Not DV 36
Sid Meier's Civilization IV: Warlords 38
CivCity: Rome 39

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Volume 19 : Number 10

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Home recording studio primer

You may not be George Martin, but you may not need to be

Way back when, when Joe Clark ruled the country and Neil Young advised us that "Rust Never Sleeps," musicians who wanted a permanent audible record of their exploits faced a far more challenging situation than they do today. Indeed, it was enough to give any self-respecting rocker a serious case of the blues.

If you had the bucks, you could pile your gear in the VW bus and truck on down to the nearest recording studio. If you had lots of bucks, you could leave your amp at home, use the primo Marshall stack at the studio, and hire yourself an audio engineer to boot. In either case, time was of the essence – you'd have precious few hours to play or sing all your parts correctly and somehow get everything to sound just right afterward.

But not everyone could afford to rent a studio, its equipment, and its personnel. Fortunately, there was another solution. With a few hundred bucks, aspiring musical icons could buy a decent reel-to-reel machine or a four-track Fostex cassette recorder and commit all their tuneful masterpieces to tape without ever leaving the comfy confines of their home.

Yet the home studio of the past had severe limitations. Multitracking (the recording and layering of several individual instruments or sounds to create a harmonious whole) was difficult with tape, particularly when dealing with the restrictions of consumer level tape recorders. Editing (removing and/or replacing flawed passages or notes) required patience, surgically precise knives and measurements, steady hands, and tiny pieces of sticky tape. And if you wanted to add audio effects such as reverb or delay, the associated hassles were many.

The digital studio has changed much of that. With the right computer, a few specific peripheral items, and a ton of studying and experimentation, anyone seriously interested in home recording can produce results that'll send the four-track tape crowd back to the proverbial drawing board. Of course, there's no substitute for musical talent, but just ask Britney Spears how much of that is needed when just about anything can be tweaked during post-production to become just about anything else.

You might think that the obvious hub to any digital recording studio is the PC, but that's not always the case. Indeed, those who don't want to bother with the setup, the software choices, and multiple options and configurations of a PC-based DAW (Digital Audio Workstation) may instead opt for all-in-one units that are loaded with easily managed proprietary software and built only for audio recording. This is also a great way to go if your budget is a key consideration – as evidenced by sub-$400 entry-level units from the likes of Fostex (MR-8 Mk II 8-Track Digital Recorder), and Boss (BR600 8-Track Digital Recorder). If your ambitions go no further than laying down a beat and recording a couple of guitar or piano lines and a voice, these value-conscious machines certainly have their place.

But standalone units are by no means confined to the low end of the price or performance spectrum. If you want to do more with your music, look to 16- and 24-track units from Roland, Boss, and Yamaha. These systems offer perks such as hard disk recording, CD burning, built-in effects and drumbeats, support for lots of tracks, and a more palatable learning curve than full-blown PCs. However, one of these babies will run $2,000 and up.

Moreover, even the best standalone DAWs don't offer the versatility or the potential of a PC. They aren't as upgradeable, they generally won't accept third party software, and they limit you in terms of expandability. Truth is that if you're not afraid of computers, you should seriously consider a PC as the "engine" that drives your home recording studio.

But how much of a PC do you need? In the audio recording world, you need as much as you can afford. Lets' break it down, piece by piece.

CPU

Though you can theoretically run a sub-Pentium or sub-Athlon DAW, you shouldn't. Entry level CPUs may deliver enough juice to record your dulcet vocals or your next great Rush-inspired guitar riff, but they strain mightily under the weight of multiple tracks, post-recording effects, virtual

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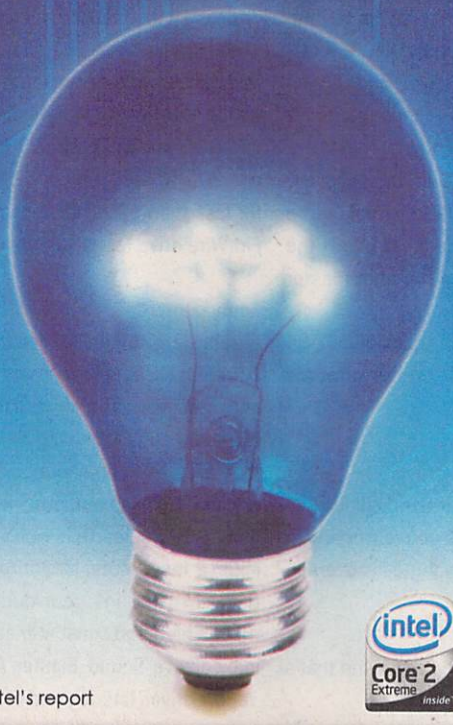

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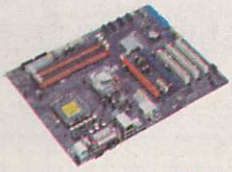

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instruments, and the like. And when a CPU is pushed to its limits (many DAW programs include on-screen CPU usage meters to graphically display the horrors), you're faced with dropouts, murderously long load times, and all manner of other nasty repercussions.

These days, a 2.8HGz Pentium or a 2800+ Athlon is the bare minimum for even a cost-conscious DAW. In fact, considering recent CPU price drops, and the upcoming release of the 64-bit version of Windows Vista, and the fact that PC DAW leader Cakewalk has now converted its flagship product, Sonar, to 64-bit processing, a 64-bit dual core chip is the recommended route for any hardcore setup. Why 64-bit? Primarily because the architecture supports vastly expanded memory allotments, meaning you can load more effects, more processes, more virtual instruments, and larger, more authentic samples into RAM, thus reducing the dependency on both the processor and the hard drive. 64-bit chips have also proven flat-out faster than equivalently rated 32-bit CPUs.

If 64-bit technology is currently a bit pricey for you, consider 32-bit processors with hyper-threading or dual cores. Both will do the job more efficiently than old school single-core CPUs.

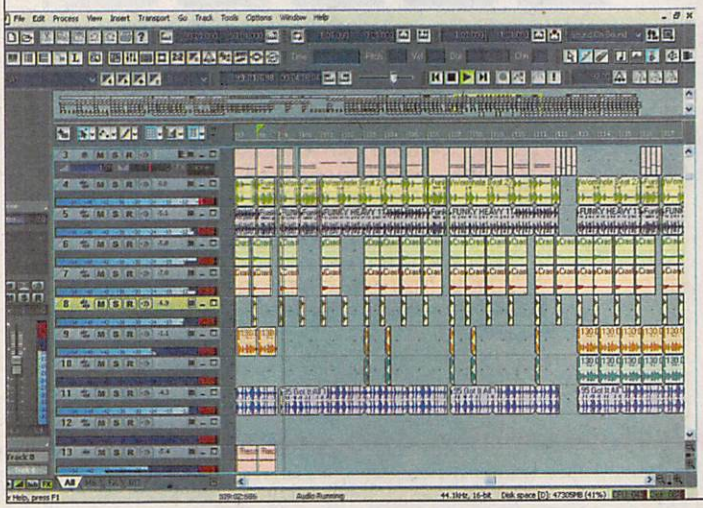
Memory

It's simple really – any DAW with less than 512MB of RAM is ridiculously ill-prepared. Will a full gigabyte help? Definitely, but unless you're working in a 64-bit environment, anything more than a couple of gigabytes is overkill.

Storage

Compared to even a couple of years ago, hard drives are cheap. And that's a good thing, because WAV files (the file format of choice for digital audio recording) are space hogs. Before mixdown, it's not unusual for a single ten- or fifteen-track song to snap up 500MB of your hard drive. Multiply that by perhaps several dozen tunes, add a few virtual instruments and loops – all of which greedily gobble megabytes – and you can see how a small hard drive is an ineffective hard drive.

Additionally, because you want to read (and write) information as quickly as possible, and because an operating system and whatever applications you're running will fight your music for hard drive priority, you may want to add a second drive strictly for your audio files. These days, you can grab two 200MB hard drives, each running at 7200 RPM and with 8MB buffers, for less than $200. Wise composers will also want an external USB 2.0 or FireWire drive for backups and archiving.



Sound card

There's a great deal of discussion in various online communities as to the currently accepted minimum standards of a modern DAW sound card. In the end, it seems to be universally agreed that a card supporting a data width of 24 bits and a sampling rate of 96kHz will do a wonderful job. Moreover, if that card has a "breakout box" to isolate the cables from the electronics and provide extra ins and outs, it's an even better bet. Two tried and true "pro-sumer" examples that won't totally break the bank include the Echo Mia MIDI (2 ins, 2 outs, MIDI in/out, S/PDIF, no breakout box) and the M-Audio Delta 44 (four ins, four outs, breakout box). It's worth noting that even though high-end consumer cards such as the ubiquitous and comparatively inexpensive Sound Blaster Audigy and X-Fi can do the job, many users report driver, latency and noise floor issues.

Graphics card

Happily, you can make up for some of the money you've spent elsewhere when you purchase a graphics card. Since you don't need high-end 3D capabilities because DAWs don't run in 3D (yet, anyway), plan to spend $75 or so for last year's 256MB nVidia or ATI-based card.

Controllers

A decent wireless mouse and a good keyboard will work just fine for most amateur project musicians. However, there will come a time when you're sitting behind your piano or your drumkit and no longer want to trudge back and forth to the computer for each new take. There will also come a time when you realize you could do so much more with real hardware knobs, buttons, and sliders. This is the time you'll come to love DAW controllers.

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There's a lot of variety here, and a lot of choices. Some have a built-in audio interface. Some are highly portable, and some are not. Some are wireless. Some are better suited to particular DAW programs. Prices run the gamut from a hundred to several thousand dollars, so check those Internet discussion groups and choose wisely.

Speakers

When you audition and tweak your recordings, you want your speakers and amplification system to be as accurate and as generic as possible. That way you'll have a neutral product that sounds as good through your car stereo as it does through your subwoofer-equipped living room setup. Powered (active) studio monitors are purpose-built for the task, delivering neutral sound and negating the need for a space-hogging external amplifier. They are thus the ideal solution for non-professional hobby studios, though budget conscious shoppers may want to pick up an old stereo amp, level the tone controls, and purchase a set of inexpensive "passive" monitors. Alesis, Mackie, Event Audio, Yamaha, Tannoy, and Behringer all offer a full range of active and passive alternatives.

Microphones

If you sing, look no further than the Shure SM58. Featuring a noise-minimizing spherical filter and a frequency response tailored to the human voice, it's been the vocal mic of choice since The Beatles roamed the earth. If you're miking an acoustic guitar or electric guitar amp, check out the equally time-honoured Shure SM57 or the substantially pricier SM81. Drum miking is much more complex and can involve as many as eight or more separate mics, but you can do a decent job with two or three SM57s and an AKG D 112 for the kick drum. Add an overhead AKG 1000S for extra flavor, or ditch the drum-miking idea entirely and invest in an electronic set such as Roland's V-Drums.

Software

The current crop of DAW-oriented software is staggeringly wide-ranging. For comprehensive solutions that'll handle everything from multitrack audio recording to MIDI to every form of post-production tweak known to man, look to leading contenders such as Cakewalk's Sonar, M-Audio's Pro Tools M-Powered, or Steinberg's Cubase. More affordable, slightly less capable options include FASoft's nTrack, Cakewalk's Guitar Tracks Pro, and Mackie's Tracktion 2.

There are literally hundreds of other software applications and utilities on the market, each of which specializes in a given aspect of audio production. If you favour audio loops – short pre-recoded audio files that sound like continuous pieces of music when repeated (very popular for backing drumbeats and in techno and hip hop music) – you can either stick with loop-accommodating programs like Cakewalk's Sonar or move into fully loop-centric applications like "Acid Pro" or one of its stripped-down offspring. If your project calls for, say, an original saxophone line but you don't have a saxophone, you can buy yourself a MIDI keyboard, acquire a freeware or shareware saxophone virtual instrument, and "play" a reasonable sax facsimile right there on the keys.

And if you need drums but have no drum kit, check out highly rated but rather complex software drumming solutions such as ToonTrack's Drumkit From Hell or EZ Drummer. Or make things easier on yourself and look online for quality drum loop sets from respected suppliers such as Drums on Demand and Beta Monkey.

Guitarists Only

Correctly miking a guitar amp so it doesn't sound like a buzzsaw and won't wake up the neighbours has proven to be one of home recording's trickiest tasks. Fortunately, one of the joys of modern recording technology is that you don't need to mike. Today, many amateur and professional electric guitarists turn to all-in-one effect boxes/amplifier simulators such as the Vox Tonelab SE, the Line 6 POD XT, the Digitech GNX3000, and the BOSS GT8. All of the above connect directly to the sound card via cable, thus allowing guitarists to play at virtually any volume and eliminate miking hassles.

Alternately, you can do away completely with external hardware amp/effect boxes and instead make use of the latest crop of software guitar solutions. The primary advantage to packages such as Native Instruments Guitar Rig, IK Multimedia's Amplitube, and Izotope's Trash is that your guitar sound enters the computer completely clean and unaffected, ready for you to alter it over and over again later. If you dig the sound of a fully cranked Mesa Boogie, you can dial it in. If you change your mind after you hear it in the mix, you can do that too.

A final word to the wise: If possible, build a dedicated audio workstation. Should you work with audio on the same computer you use for everything else, you'll inevitably reach a point when all those little applications you load into your startup routine, all those remnants of uninstalled programs, and all those minor system alterations will conspire to cripple your speed and performance. One other thing – keep your machine disconnected from the Internet unless you want to bet that a virus won't wipe out your years of hard work.

Good luck and happy recording.

By Gord Goble

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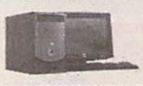

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More Power to You

One of the problems with Nickel Metal Hydride batteries is that they lose their charge, even if they aren't used. Sanyo and Panasonic have introduced new batteries that address this so-called self-discharge problem.

Panasonic says its new line of NiMH products hold 80 percent of their charge even after being stored for six months. The new batteries use a second-generation formulation that Panasonic calls R2 Technology.

These will be available in AA and AAA sizes and in kits that include batteries and a charger. Suggested retail price for a set of 4 batteries is $24.95.

Sanyo claims its Eneloop brand of next-generation NiMH batteries will retain 85 percent of its charge for up to a year. It also says the Eneloop products have improved low temperature performance. The products are available as AA and AAA cells and cost $17.99 for a pair or $29.99 for four. Sanyo is also selling chargers for the new cells.

Both companies are marketing the new batteries as a kind of buy and go product, since they can be pre-charged like alkaline batteries, and the low dis-charge rate means a longer useful shelf life.

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Audio file formats explained

"MP3 player" is often used to refer to any device that plays digital audio files. However, just like the Xerox machine, Rollerblades and Kleenex, the term is far from accurate – you could just as easily be listening to WAV, WMA, AAC or OGG files in your "MP3" player. And that's just to name a few.

Why so many audio file formats? Some were developed by certain companies as proprietary formats for specific devices and applications. Others are designed to be used in certain specific circumstances, such as loading up a digital audio player with tunes or archiving a music collection digitally. The following is a look at some of the common formats that you're likely to come across.

Lossy formats

MP3 remains the most common digital audio file format, and it's a safe bet that any digital audio player will play MP3s. The format was developed in 1991 by using a technique called "lossy" compression, which reduces an audio file size to roughly one-tenth of its original uncompressed size by removing portions that are inaudible or faintly noticeable to the human ear (such as doubled frequencies, extreme high pitches, and harmonic overtones).

Colby Leider explains the concept of MP3 lossy compression in his book Digital Audio Workstation ($57.95; http://books.mcgraw-hill.com) as follows: "Think of a somewhat analogous scenario in three-dimensional computer graphics: If an object is in front of (masking) another object behind it, there is no need for the computer to render the masked object; it would be a waste of processor resources, because we could not see it anyway. The computer just needs to keep track of where the masked object is in case it becomes no longer masked, and hence visible."

The compression rate of MP3 is somewhere between 10:1 to 12:1, meaning that the size of audio recorded at standard CD-quality 16-bit/44.1-kHz rate is reduced to roughly 1MB per 1 minute of music.

MP3 files do lose some of their fidelity in the process, but the trade-off for giving up a bit of sound quality is smaller file sizes and faster transmission – ideal for people who want to load up a digital audio player with as many tunes as possible.

Other lossy file formats likely to be encountered are AAC, ATRAC, WMA and OGG. The first three are proprietary formats developed by Apple, Sony and Microsoft, respectively.

AAC, which stands for Advanced Audio Coding, is the proprietary format of Apple's iTunes music store. The format uses the .aac or sometimes the .m4a file extension, and it was put forward as a comparable, yet superior, format to the MP3. Many experts say that AAC files sound better than MP3s at the same bit rate, and can achieve the same sound quality as MP3s at half the bit rate. AAC files also incorporate iTunes-related DRM (digital rights management) which, for example, limits the number of times an AAC file purchased from iTunes can be burned onto CDs or transferred to other devices. Applications that recognize AAC files include iPods, the iTunes music player, cell phones including Sony Ericsson W800, Nokia N91, Motorola ROKR E1, and Sony's PlayStation Portable (with firmware upgrade 2.0 or higher).

Similarly, ATRAC (Adaptive Transform Acoustic Coding) is Sony's attempt at a proprietary file format for its electronic devices. Sony branded audio

players, MiniDisc players, and the PlayStation Portable all recognize the ATRAC format (.atp, .atrac, .oma or .omg extensions). Sony developed ATRAC3 in 2000 and ATRAC3plus in 2003, each featuring a higher compression ratio than the last. ATRAC3plus is capable of 20:1 compression (ATRAC3 offers 10:1).

Testing (www.rjamorim.com/test/multiformat128/results.html) has found ATRAC3plus inferior in sound quality to comparable codecs like MP3 and AAC.

WMA (.wma) was developed as a proprietary MP3 equivalent for Windows Media Player, but is supported by numerous other devices as well including Creative products, Dell Jukebox, Sandisk Sansa series, and the Sony PlayStation Portable with firmware update 2.60. One minute of 16-bit/44.1-kHz audio is approximate 0.67MB.

Ogg Vorbis (.ogg) is an open-source format that uses a non MPEG-based codec. The OGG format is rapidly gaining popularity, as is evidenced by the increasing number of audio players that support it (including various Samsung and iRiver players, MPIO FG200, LG JM53, Winamp and Whamb Digital Audio Player (Mac).

Lossless formats

The second grouping of audio files use "lossless" compression, where the audio files are compressed without any data loss. Because of this, files are better quality but significantly larger than those compressed into lossy formats. While your portable player might fill up quickly if you try to stuff it full of lossless files, the format is recommended for creating long-term archival libraries of music files (such as a ripped CD collection) since quality doesn't degrade.

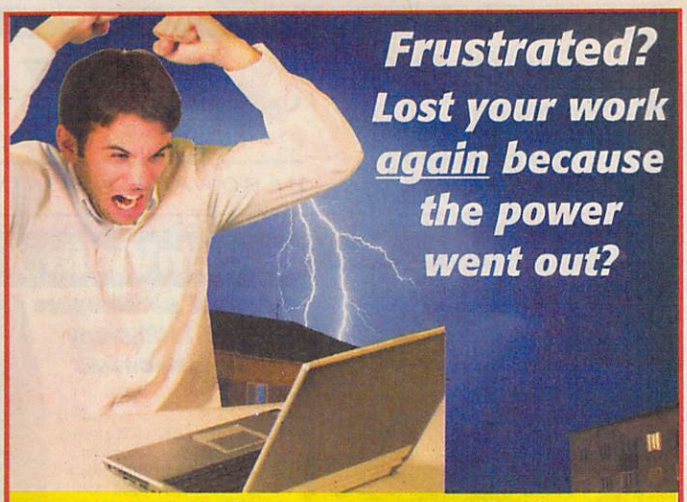
The most common lossless format to PC users is WAV (.wav), which is considered the standard file format for storing uncompressed CD-quality sound. The size of a WAV is comparatively large at 10MB per 1 minute of music. In other words, a 3-minute song converted into WAV would be around 30MB as opposed to a 3MB MP3. The WAV format is supported by apps including Windows Media Player, QuickTime, iTunes, Dell Jukebox, Sony PlayStation Portable, and audio players including iPods, Dell Jukebox, Creative Zen Vision:M, andZen V, and the Sony Bean.

The AIFF format (.aif, .aiff), co-developed by Apple, is the standard audio file format for Mac computers. (Think of AIFF as being to Mac what WAV is to Windows.) The format supports multi-channel audio files and can achieve a compression ratio of as high as 6:1. Applications that support .aiff include QuickTime, Windows Media Player, iTunes, and iPods.

The FLAC (Free Lossless Audio Codec) format is a relatively new lossless format that is notable for a few reasons: it's open-source, supported by multiple platforms including Mac, Windows and Linux, and its developers are adamant that the format will never support any kind of copy protection or digital rights management restrictions (such as those found on files that are downloaded from most online music stores). The format is capable of compressing and decompressing files up to 50 per cent without any data loss, which makes it perfect for archiving large audio collections and trading or distributing music online.

RealAudio (.ra, .rm, .ram) was developed by RealNetworks to work with RealPlayer. With a compression ratio of up to 16:1, the format was essentially designed for streaming music across the Internet at low bandwidths. RealAudio was at one time used by numerous Internet radio broadcasters and Web sites, although more people are turning to the better sound quality of streamed WMAs to achieve the same purpose.

By Erin Bell



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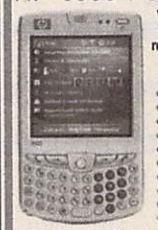

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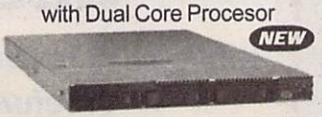

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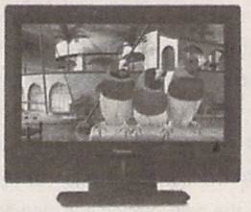

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Moving to Mac

A sneak peek at Leopard

The keynote at Apple's Worldwide Developers Conference at the beginning of August didn't just have new hardware announcements; there was also a sneak peek of the anxiously-awaited update of the OS X operating system, code-named "Leopard". And while this particular cat streaked by fairly quickly – there's still a lot that the company isn't able to talk about – there were ten key items that the company was able to fill us in on:

1) 64-bit Intel application support

While the current version of OS X features 64-bit support for Unix-based apps, the new version will also add 64-bit support for apps compiled for the Intel processor, including Carbon and Cocoa-based apps. The 64-bit apps and 32-bit apps will be able to run simultaneously.

2) Time Machine

While everyone knows that they should be backing up their important data on a regular basis, most people don't actually follow through: in fact, in a recent survey Apple discovered that only 26 percent of their users were backing up at all, and only 4 percent were using automated backup software. The new Time Machine application is designed to take care of the backup process automatically--you just plug in an external hard drive, and Time Machine can configure it as a backup drive. The application not only backs up everything on your machine, it also keeps track of multiple iterations of files and folders, so whenever anything changes, a new version of the file or folder will be added to the Time Machine. That way, if you mistakenly delete a file or save over it, you can fly back through time and recover the file you want from a time when the file still existed on your system. The space-themed graphic interface is a tiny bit cheesy, but the timeline bar and cursor controlled navigation do allow users to "travel through time." There's no news yet as to whether Time Machine will also be able to back up other external drives, but what is known is that the drive you use for backup will not be able to be used for other storage... it will be a dedicated Time Machine drive.

3) "The Complete Package"

At the moment, there are a number of applications available only for certain versions of the Mac, like PhotoBooth or FrontRow. With the new version of OS X, all of these applications will be available on all machines, plus currently-available beta software like Boot Camp will be included as final versions, with even more features.

4) Spaces

With all of the multitasking that we do these days, everyone knows just how precious desktop real estate can be. Spaces is a new virtual desktop solution, which means it will already be a familiar concept to some Windows users; the main difference is you navigate using Command keys rather than having to click an icon in the system tray. You can drag applications to any of the virtual desktops, and go straight to those virtual desktops by clicking on the dock icon for the application you want to go back to. During the keynote, the application was demoed using four virtual workspaces, but it's likely that the Leopard will be able to handle at least nine virtual spaces.

5) Spotlight

In addition to the new ability to search other computers on your network (including servers), the new version of Spotlight will also add more advanced searching capability like Boolean searches and the ability to refine searches by file-type. The Spotlight window will also bring up recently-accessed items automatically, so you may not even have to type in a search query to find the items you are looking for.

6) Core Animation

Joining Core Audio, Core Image and Core Video inside the OS, Core Animation will take advantage of the rendering power found in most new graphics cards. Most users won't interact with this feature directly, but developers will now easily be able to generate three-dimensional interactive menu interfaces, screensavers, and similar items, all with a minimum of coding.

7) Universal Access

Leopard will add to the accessibility options available in the OS X operating system, including additional support for Braille and closed-captioning. The VoiceOver text-to-speech application also now reads text in a more natural speaking voice, even at high speed.

8) Mail

The built-in Mail app adds stationery capability, allowing you to use standard templates or to build your own (for business correspondence, or something more fun, perhaps); all stationery will be configured using standard HTML, so it should be compatible with the majority of modern email clients. Mail will also have two new standard folders: Notes, and To Do. Many users apparently send notes to themselves via email (I'm guilty of it!), and now by flagging email as a note, it will automatically appear in the Notes folder. You can also highlight items and turn them into To Do items, complete with priority and due dates. (There will also be a tie-in with other applications on the system to, with full details to come.)

9) Dashboard

There are already over 2,500 widgets available for the Dashboard, but there are two new tools coming that will make widget creation even easier. Dashcode is a new toolkit for developers, complete with templates, a parts library

(search fields, etc), as well as a Javascript editor and debugger. For everyday users, Web Clip turns a portion of any web page into a dashboard widget: you simply click the Web Click icon in the new Safari browser, realign and resize the window to the portion of the page you want as a widget, and click "done." The portion that then appears in your dashboard is live HTML: you can click it and refresh it just like you would a regular webpage, and it will open in a new browser window.

10) iChat

Apple's instant messaging software is getting a number of new features, including tabbed chatting (for managing multiple chats), animated buddy icons, the ability to record your video chats, and the ability to become invisible to certain users. Users will also be able to apply real-time effects from the PhotoBooth application to their video chat, or deliver iPhoto slideshows or Keynote presentations over the live video stream. There's also a new feature called Backdrops that samples the background image when you're not in front of the camera, and then replaces it with a still photo or motion video of your choice; there's a bit of a halo around the user, so it's not perfect (ie you can't use it to pretend you're in the office) but it should make iChat a lot more fun for the average user.

The one bit of unfortunate news is that Leopard isn't due to hit the shelves until Spring of 2007; in other words, those who were hoping for a fall launch date in order to see Leopard ace out Windows Vista will just have to grin and hope that Apple does what it did with the Intel launch, and moves ahead the launch date. But don't hold your breath.

By Sean Carruthers

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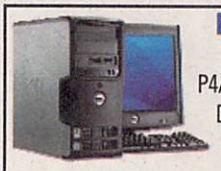

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Blue Out

Vista Watch: Windows Media Player 11

It's no secret that the iPod and iTunes have been the subject of many a closed-door meeting at Microsoft HQ. Executives at the world's largest software company have been watching in a sort of slow motion horror as, over the past five years, Steve Jobs has almost single-handedly created – and hogged for himself – a brand new multi-billion dollar niche in the PC music industry.

Back in 2001 Microsoft's only real music solution was Windows Media Player (WMP), a Windows-only application that has often been derided for its clunky design and unintuitive interface. But several years have passed since the iPod and iTunes were introduced, and Microsoft's steely execs have moved past anxiety and fear to the much greener pastures of cold, hard determination – to beat Apple at its own game.

Indeed, Microsoft has been quietly working on ways to slice out a sizable chunk of the PC music pie for itself, and the software giant will finally make its move next year with a one-two punch: first the release of Windows Media Player 11 (WMP11), which will come bundled with Windows Vista when it's launched in January, followed by their newly announced Zune music products and services (see sidebar).

The new WMP has undergone a complete overhaul, now sporting a more streamlined and functional user interface that may just prove to be a worthy adversary to Apple's elegant iTunes. Vista's much talked about chrome and aeroglass bling has been grafted onto WMP11, providing an undeniably sleek 'n chic sheen. The menu bar has been replaced by a simpler command bar that provides big buttons for quick access to commonly used features, including Now Playing,

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Library, Rip, Burn, and Sync. WMP11 also makes better use of screen real estate by stacking media icons (like album art) on top of one another to show more files at once, and by providing more efficient methods of displaying groups of files and playlists.

But there's more to WMP11 than just a new dashboard. The big news is something called Urge, a WMP-only music service Bill Gates announced at CES in January. Sponsored by MTV, Urge is a repository of information for millions of songs. Microsoft Canada's Maurice Benatar calls it "a guide for musical exploration" that not only provides a means to purchase music, it also allows users to learn more about their favourite artists via interviews and biographies, delivers the ability to download blog-style playlists to explore new music (which could be used to let people check out what their favourite bands are listening to), and even provides access to video content.

Unfortunately, Microsoft has yet to announce the availability of Urge to any countries outside the United States.

Of course it seems likely that the Urge service will eventually come to Canadian shores, but even if it doesn't we may have the opportunity to access alternate services instead. Benatar noted that WMP11 has the capacity to provide access to a wide variety of pay-per-track and subscription services besides Urge that could potentially be added in the future, though, as yet, none have been announced.

But of course WMP isn't just about music. Much like previous versions of WMP, the eleventh iteration provides video capabilities as well. In addition to offering DVD and video file playback (including recorded TV), WMP11 supports the next generation DVD standard HD-DVD as well. Unfortunately, Blu-ray drive owners will have to rely on third-party solutions.

Another new feature is WMP11's photo viewing and management functionality. While the viewer isn't particularly sophisticated, the photo manager provides the ability to group and sort all of your photos using meta tag information such as date taken, star rating, and keyword. It's no substitute for a dedicated photo management app, but it could be handy for casual photographers.

Windows Media Player 11 is currently feature complete; Microsoft's programmers are now spending their days working out the kinks. To find out for yourself whether Microsoft's first real attack on Apple's PC music dominance poses any real threat, download the beta version at http://www.microsoft.com/windows/windowsmedia/player/11/default.aspx

By Chad Sapieha

No Zune anytime soon

Microsoft is being predictably tight lipped about Zune, the name given its new portable media player and delivery service announced this summer. Here's what we know so far:

- It's pronounced "zoon" (rhymes with "soon").
- The player will apparently be manufactured by Toshiba, current makers of the Gigabeat – a worthy but distant competitor to the iPod.
- It will be an "end-to-end" solution, including community and entertainment features as well as a video and music delivery service.
- Announced features so far include a built-in FM tuner, 3-inch screen, 30GB capacity and wireless Zune-to-Zune file-sharing
- It's slated to arrive on American store shelves sometime in 2007—though that doesn't necessarily mean we'll see it in Canada then.

Will the device's design be a match for the iconic iPod? Will the Zune service piggyback on WMP? Will Canadians have to wait years for Zune to be made available to us? No one knows.

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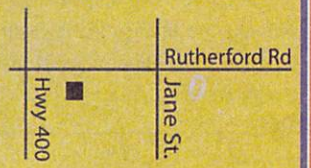

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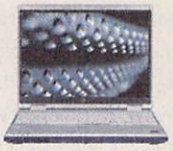

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The secret to buying audio gear

Many things in the world of consumer electronics can be compared using specifications, such as the resolution of a digital camera, but audio equipment shouldn't be shopped for by specification alone. At the end of the day, forget the spec and go listen. This article will be your guide dog through the many meaningless terms in the marketing mumbo-jumbo jungle of audio. These considerations apply to home theatre just as much as a regular stereo.

Choosing an amp that doesn't amputate sound

A good amp or receiver should be heavy and "juicy". A receiver is an amplifier with a preamplifier and a radio tuner built in. You may also bump into the term "integrated amplifier," which is just a preamplifier and an amplifier with no tuner. Finally, a preamplifier is the gizmo that allows you to switch between sources for output to the amplifier's single input. Receiver and amp can be used interchangeably. A heavy amp indicates a

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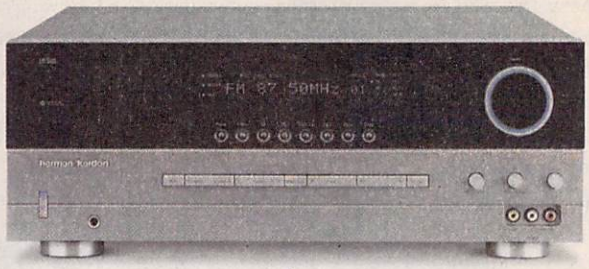
substantial linear power supply, which should give you enough current to not slow down when speaker impedance drops.

Suffice it to say that a high current amplifier is better than one that isn't. It generally gives a crisper sound at a given power rating and won't distort until a higher volume.

A 500 watt high current amp is usually better than a 500 watt regular amp. Cheaper amps use power supplies which generally weigh less and have difficulty with sustained power output at high currents. Things get mushy, including your sound. It can even start to distort, which can blow a speaker. Harman/Kardon and NAD both make high current receivers as do many other manufacturers.



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As for power rating, how do you compare RMS, peak and music watts? In other words, why are the 200 watt computer speakers not blowing out your eardrums when the 40 watt audiophile amplifier gets you evicted for the third time in a month? Well, RMS (Root Mean Square) power is the most conservative rating, being an average sustainable output, and is indicative of a quality manufacturer. Look for this. It may also be called continuous average power.

When comparing, make sure it is quoted with an 8 ohm load. Any less and it's overstated, but you can still do some simple math to compare. For instance, if it's rated into 4 ohms just cut the rated power in half. Also, there are variations on RMS power is measured so if two amplifiers are rated reasonably closely don't assume that the lower rated one is less powerful. A manufacturer who quotes peak power only, without RMS, starts to make me feel uncomfortable.

Peak power is double RMS, so cut it in half to compare. Peak Music Power Output (PMPO), on the other hand, is used to make those 3W computer

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speakers into 200W monsters that allow you to use them in your heavy-metal stadium shows. In other words, PMPO ratings are hogwash and are only limited to a marketer's imagination. When in doubt, there's often a fuse or power consumption rating on the back of audio devices which should give you a ball park figure. Remember, volts multiplied by amps (amperage) equals watts. So how many watts is enough? It depends on your speakers.

Choosing speakers that speak to you

Speaker sensitivity is rated in dB SPL (deciBels Sound Pressure Level) at 1 metre distance and at 1 watt of power. The higher the number, the louder the speaker and this is something useful to compare. Oddly enough, this is going to dictate your power requirement for your amplifier for a target listening level. Every time you double the wattage you can add 3 dB to the loudness of a particular speaker.

Let's say you have a speaker rated at 87 dB sensitivity. If you feed it 2 watts it will be 90 dB loud. Feed it 4 watts and it will be 93 dB loud and so on at a listening distance of 1 metre. Factor in the loudness drop-off from a 10 ft distance of about -10 dB and you can see even 1 watt is plenty loud. A vacuum cleaner is about 70 dB loud but this example speaker will be 77 dB loud at 1 watt from 10 feet away! A 250 watt home theatre receiver will be able to output about 101 dB and a 500 watt system will output about 104 dB using our example.

There's not really that much difference between the two in the end. Still, when matching speakers and an amplifier it's usually a good idea to get an amp that is a bit more powerful than the maximum rating for your speakers. Loudness aside, an underpowered amp can run out of juice and start

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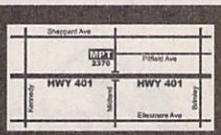

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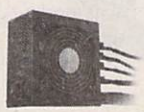
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distorting which can blow your speakers. Weird huh? Not enough power causes something to blow up. It's usually better to have something known as "head room" in the audio world where you have more power than you need. So using an 80 watt maximum rated speaker with a 100 watt per channel amp is no biggie, in fact, it's a good idea. Just don't go crazy and completely mismatch them.

Speaker sensitivity isn't the only thing to look at, though, there's also frequency response. Frequency response is the ability to replicate sounds at different frequencies. It is usually stated as a minimum and maximum value in Hz (hertz), ideally with a ± dB rating after it.

If it doesn't have that ± dB rating, the value is not meaningful because that dB indicates the volume variance within the frequency span indicated. Remember, dB measures loudness, at least in this case.

If you have a rated frequency response of 50 – 20,000 Hz ±3 dB, it means that the speaker is 3 dB louder or quieter at different frequencies between 50 and 20,000 Hz. Without that ± dB rating, it could be anything including being inaudible.

You need that dB rating, and the smaller it is the better. Sometimes there's a graph to look at, which is even better because it shows you how a speaker performs through all the frequencies.

Also, the larger the frequency span, the better. It is much more difficult to make low frequency sound. So a speaker that creates 40 Hz sound is going to be much more expensive than one that makes 55 Hz sound even though both can do 20,000 Hz with no problem.

By Andrew Carruthers

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Feature Overview
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- With network connection to a PC for direct retrieval.
- Support 3.5" Harddrive
- Web-based movie distributor as a set-top box or media gateway.
- Support high speed USB 2.0
- Support MPEG 1, 2, 4 for movie
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- Support JPG for Photo

Model No: MG-35

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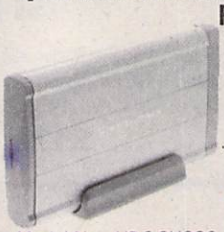

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iPod: The Next Generation

Apple has launched new versions of its iPod, iPod nano and iPod Shuffle digital audio players.

The fifth-generation iPod ($399) boasts an 80GB hard drive, which can hold up to 20,000 songs or 100 hours of video. Its 2.5-inch colour screen is 60 per cent brighter and more vibrant, and includes a slider for adjusting brightness levels. A 30GB model is also available for $299. In addition to audio, photos and videos, the new iPods can also download and play games designed specifically for iPod from the iTunes music store (www.itunes.ca). The 80GB model offers up to 20 hours of battery life for music and 6.5 hours for video, and the 30GB model offers up to 14 hours of music and 2.5 hours of video, according to Apple.

The second generation iPod Shuffle ($89) is nearly half the size of the original, weighing half an ounce and measuring half an inch thick. The new "wearable" design features a built-in clip and new aluminum case. The Shuffle's capacity remains capped at 1GB (about 240 songs), but it offers an impressive 12 hours of battery life according to the company.

The iPod nano is available in a thinner and lighter design that offers a battery life of up to 24 hours. The new 8GB capacity ($299) is available in black, while a 4GB model ($229) comes in silver, pink, green or blue, and a 2GB model ($159) comes in silver.

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Capturing the family hijinks in high def

You've got the high definition screen, now what? You can watch broadcast television in high-def, no problem, and may have even rolled the dice on a HD-DVD or Blu-ray player. That's all very well, but what about your home movies? Surely, it is a complete shame that little Tony's current pubescent pizza face will be delivered mushy when it comes time to fire up the oven and roast him at his wedding. We need to see the pepperoni on Tony or else his wedding roast will be underdone. Bad bad-skin jokes aside, high definition home movies are great for documenting friends and family in a way that can really take you back to when the video was shot. That extra resolution can reinforce a sense of time and place and capture little details that might otherwise disappear into the ether of time. The format is called HDV and it uses MPEG2 for compression just like DVDs and regular DV tape.

Currently, Sony offers the HDR-HC3, JVC the venerable GR-HD1 and Canon the HV10. These are the low end of HDV camcorders allowing regular Joes to do their stuff without requiring a post-secondary education and a suitcase full of ill-gotten gains. Well, the JVC is a bit pricey. Also, it's different in that it shoots progressively at 720P. That is where the full frame is captured all at once instead of every other line at twice the frequency. Progressive scan is a good thing but it is done at the cost of resolution, which is a bad thing. In general, there aren't a lot of camcorder choices out there, but make sure the output from it matches the input to your display.

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Look for HDMI or component outputs as well as FireWire. HDMI is a more future-proof choice. The thing is, there isn't really any reasonably priced HDV VCRs right now and you'll probably be using your camcorder for playback.

FireWire, i.LINK or IEEE1394 all mean the same thing and are the way the camera sends its HDV files to a computer. It is no different than DV in this sense, other than your editing software needs to support HDV. Most cameras come with software to do simple edits and all come with capture utilities. For editing, take the minimum requirements with a grain of salt as you will need quite a powerful computer with a good amount of RAM, a powerful processor and, of course, a FireWire port. A 3.4 GHz processor and 512MB is a starting point. Editing MPEG2 without an intermediary codec requires a lot of processing but not really large or fast hard drives. If you have Premiere Pro, Vegas or some other higher level editing program, an intermediary codec can help speed editing and retain quality. If you use one, get a hard disk array too because the files will get much bigger. The problem is that compressed formats such as MPEG2 aren't really designed to be edited, and degrade when recompressed. An intermediary codec helps solve this by being lossless and increasing speed. Highly recommended.

HDV only records a full frame for every six or 15 frames it actually displays and the rest of what it stores is the differences between those frames. If those differences are large, MPEG2 starts to have trouble maintaining picture quality. What this means is you can't pan, tilt or zoom quickly and you should really shoot with a good tripod. Whatever brand you choose, expect to spend $250 and up.

Also, MPEG2 compression means that if the tape gets a glitch in it, you get to watch that glitch for up to a half a second until the next full frame shows up. So, you need to be extra careful about how you store your tape. You also need to keep your camcorder clean and whatever tape you use, use the same brand all the time. This is because tape lubricants are formulated differently. When mixed they can actually become sticky which is a big no-no. This problem has been reduced of late but better safe than sorry. Well, there you go, you're ready to go shooting friends and family in high def like a vice president on a hunting trip. Finally, the HUB would like to apologize for the bad pizza face joke. We know it was cheesy, in bad taste and suffered from poor delivery. At least it was under 30 minutes and free.

By Andrew Carruthers

HDV Camcorders

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www.sony.ca

Canon HV10 $2000
www.canon.ca

JVC GR-HD1 $4000 (est.)
www.jvc.ca

HDV Editing Software

Adobe Premiere Pro
www.adobe.com

Sony Vegas
www.sonymediasoftware.com

Avid Xpress Pro
www.avid.com

Final Cut Pro
www.apple.com

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Fill 'er up! Tunes for your iPod

A cheap way to pack your iPod full of tunes

Until recently, there have been only two ways to fill up your portable music player with music: One is to rip your favourite CDs into audio files like MP3s, WMAs or AACs and then copy those files onto the device. The other way is to download music from the Net, be it from legitimate online stores such as iTunes or Puretracks or by hitting the peer-to-peer file sharing services to snag pirated tunes.

The problem with the first way is that eventually you'll rip all your CDs, while the second way – buying or stealing music from cyberspace – can be costly or risky, respectively.

Now there's a third way to pack your player with tunes – and the good news is that it's cheaper, easier and you'll have more music than you know what to do with.

Intrigued?

By recording streaming Internet radio stations and then listening to the songs on your iPod or other MP3 player, you are essentially "time-shifting" and "place-shifting" thousands of near CD-quality songs. Best of all, you can fill up your portable audio player every night so you can wake up to a brand-new soundtrack. And yes, this is perfectly legal – it's just like using a VCR.

Many programs let you do this – some are better than others, of course – so let's take a look at a couple of award-winning solutions.

iFill

(Griffin Technology; ifill.griffintechnology.com; free to try, US $20 to buy)

Designed for both Windows and Mac users, iFill is an easy-to-use iPod utility that lets you download Internet radio streams from hundreds of available stations, and covering all major music genres.

Simply browse radio stations by name, genre or desired bit rate (the higher the number, the better the sound quality but the bigger the file). Check off which stations interest you – and you can select multiple radio stations to record simultaneously – and the tunes are then sent directly to your iPod, so it won't clutter up your computer's hard drive with files.

If desired, you can select how much space on the iPod is allocated for iFill music. Or you can simply let the program fill up the player and then delete what you don't like. By checking off a box on the main iFill screen, you can also tell this program to erase your last "fill up" before copying new tracks over to the player.

Not only are the songs without annoying DJ banter but each tune

becomes it's own file (and not one long file containing 1000 songs). Plus, ID3 tag information is retained so you can read the song, artist and station info on your iPod or iPod nano screen. You can use iFill with multiple iPods, if desired.

Some of the downsides to iFill, however, is that it's not compatible with non-iPod based MP3 players and there was a fair bit of song repetition, too.

Overall, though, the Griffin iFill proved to be an easy to use and handy iPod accessory – especially for those with plenty of unused space on their 30GB or 60GB players. You can try this program for a week before dishing out cash.

Pros: Music goes right to the iPod; works with Windows and Macs

Cons: Only works with iPods; some song repetition and cutoff tracks

AudioXtract

(AXT Unlimited; www.audioxtract.com; free to try, $30 to buy)

Turn your PC into an Internet radio recorder with the aptly name AudioXtract, a program that can record many Internet streams for enjoyment on your computer or portable music player.

Unlike the Griffin iFill, AudioXtract saves the files as MP3s to your computer's hard drive. While many may prefer how the iFill puts the music on the connected player instead of on the PC, AudioXtract at least works with non-iPod based products, too (or you can burn a CD with the downloaded music).

Similar to the iFill, AudioXtract lets you choose to record from

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hundreds of radio stations (or you can add your own by typing in the URL). If you're looking for a particular genre, such as classic rock, hip-hop, disco or jazz, you can type in a keyword into the search engine.

You can record up to eight simultaneous radio stations at once and even schedule the program to record a favorite radio station at a certain time of the day.

The AudioXtract interface, while not as clean or pretty as the iFill screen, lets you easily remove duplicate songs with the click of a button. But on the flipside, the iFill had far fewer songs with the end or beginning cut off compared to AudioXtract files.

For those who want to test drive AudioXtract, the official Web sites lets users download 100 free MP3s. If you like what you hear, you can purchase the software online or pick it up at select Canadian retailers, such as Wal-Mart, Costco and Best Buy.

Pros: Works with all MP3 players; can set timers; search for favourite genres

Cons: Clutters up hard drive; ,many song cutoffs; interface not as clean as iFill

By Marc Saltzman

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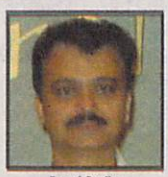
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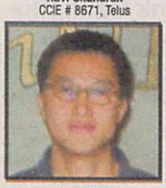
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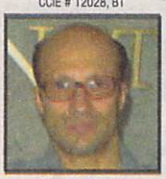
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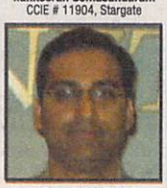
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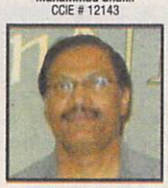
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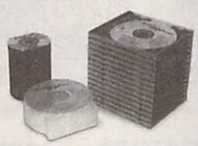

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Going loopy over loops

Making music the drag and drop way

When Sony gave me a demo of ScreenBlast Acid Deluxe 2.0 a few years ago, I'd not heard of loop software before – but was immediately hooked. Some months later a Mac-user friend emailed me about this neat program Apple had just announced called GarageBand, which did loops too. Fast-forward to today and GarageBand is now in Version 3 (part of iLife '06), while Acid 2.0 has morphed into Sony Acid Music Studio 6 ($89.95). These programs do more than just sequence loops, but that's the aspect I want to focus on.

If you're not familiar with loops, they are snippets of music. You can find loops for most popular instruments and musical genres, as well as for sound effects, jingles for advertising work and even vocals. They're called loops because you can join them together, just as sound engineers used to physically join the two ends of a piece of audiotape to form an endless loop that played over and over. By design, when you play a digital loop continuously, it creates a coherent rhythm or melody. GarageBand and Acid Music Studio (and other similar products) allow you to build unique compositions using these off-the-shelf musical parts.

For example, suppose you want to create a waltz. You find a drum loop that has a 1-2-3 waltz beat – but that's all you'll likely hear in the loop, a single 1-2-3 measure. As you repeat or loop the drum segment, it will begin to sound like a drummer tapping out a continuous waltz beat – and voila, you've just created a drum track for your waltz. To that you can add other instruments – strings or horns for example – and build a unique composition.

Both GarageBand 3 and Acid Music Studio 6 include loop libraries to get you going, but there are many commercial sources for loops (including Apple and Sony). Magix recently sent us a huge collection of loops called Soundpool DVD Collection 11 (available from Magix's e-store for US$29.95), which is a DVD compilation of several libraries it had previously released on CD. It contains 7,000+ loops in CD-quality WAV format. Magix also has a loop sequencing program called Music Studio 11 Deluxe.

GarageBand and Acid Music Studio have a similar layout with a multi-track timeline dominating the main screen. A file browser lets you show directories that contain your loops and when you highlight a loop file, the program plays it so that you can preview it. To add a loop to your composition, you simply drag and drop it onto an empty track.

To build the composition you lay down the various loop tracks onto the

timeline in sequences that give you the sound you want. In Music Studio this process is quite elegant – using a pen- or pencil-shaped cursor, you simply draw or paint onto the timeline wherever you want that instrument to play. For a continuous bass rhythm, for example, you'd paint it continuously over the length of your song. If you wanted something like a cymbal to play just twice at particular points, you'd paint it only onto those parts of the time line.

For continuous play of a loop, GarageBand works the same way – you draw out the loop over the timeline and the loop repeats for that duration, but for discontinuous segments, I found GarageBand's cut and paste not quite as slick as Acid's paint method.

In both programs, once you've laid down a loop sequence you can edit it by changing its duration, moving it along the time line or erasing it. You can set a master tempo measured in beats per minute for your song and any loop you drag onto the timeline matches your master tempo. You can also change the master tempo at any time, and in this way change the length of a composition without altering the pitch.

What can you do with loops? If you are a musician, the answer is obvious – compose music. But there are other multimedia applications as well where music is important. I find them a good way to produce unique background music for a video or slide show; for example creating an audio track in Acid Music Studio and then importing the WAV file into a video-editing package like Premiere Elements.

GarageBand has a particularly nifty level of integration with other Apple software. With an iChat session, for example, GarageBand will record each participant's chatter on a separate track. When creating a podcast, you can add an artwork track to GarageBand and then drop in some visuals.

By David Tanaka

Team work in Word

Throw away your sticky notes when you're working on a long document and do all the work in Word. With Word's tracking tools, you don't need to make notes or write reminders on loose sheets of paper. And you don't need to cut a paragraph and save it in another document just in case deleting it was a mistake and you need to put it back again. Tracked changes and document comments can take care of all this and they keep the information where it is most required – inside the document you're working on.

While these tools were designed to be used during group work to help you keep track of changes when you're working on a document in collaboration with others, they also work very well when you're working by yourself in a team of one.

Highlighting

When all you need is to draw attention to some text, use the Highlight tool. Click the Highlight button on the toolbar and drag over words to highlight, provided you didn't have text selected before you clicked the button, the Highlighter tool stays turned on until you press Esc or click it again. To highlight one piece of text, select the text then click the Highlight button. Alternately, choose a different highlight colour from the dropdown list to the right of the icon.

To remove highlighting, select over the area containing it, and, from the dropdown menu beside the Highlight button, select None. Highlighting can be hidden from view but not removed by choosing Tools, Options, View tab - deselect the Highlight checkbox to hide it and reverse the process to view it.

Comments

Comments allow you to include explanatory text or reminders in your document without affecting the text on the page. To insert a comment, click where it is to appear and select Insert, Comment. Type the reminder or question in the Comment balloon or comment area and then click back in the document. Comments are marked with your initials to indicate who wrote them. If the initials are incorrect, choose Tools, Options, User Information tab, and type the correct initials in the Initials area. To view a comment, hold your mouse over the comment balloon and the comment text will be displayed.

Voice notes

You can also add short voice notes to a document using your microphone. Choose View, Toolbars, Reviewing and, if the Insert Voice button appears, click it and click the red button to record your note. Click the Stop button when you're done and close the Sound Recorder.

If the button is not on the toolbar, click the Toolbar Options button at the end of the Reviewing toolbar, click Add or Remove Buttons, Reviewing, and click Insert Voice to add the button. The sound is saved with the document and can be played by clicking on it.

Tracking changes

When you're unsure whether to delete a paragraph or not, tracked changes gives you the best of both worlds. To enable it, choose Tools, Track Changes. Now everything you add is identified by a colour and underline and everything you delete is marked with strikethrough so it looks deleted. On the Reviewing toolbar you can choose to view these mark-ups or not by selecting an option from the list. For example, choose Final to see your document as it will look with the additions and without the deletions. However, these all still being tracked so, you can click Final Showing Markup to see them again.

If you want to undo a deletion, select the text to undo and click the Reject Change/Delete Comment button on the Reviewing toolbar to reinstate it. When you're done, if you like all the changes, click the Accept All Changes in Document option which is on the Accept Changes menu. Alternately you can move from one change to the next using the Next button on the Reviewing toolbar and accept or reject each change one at a time. Use Tracked Changes to experiment with edits and still give yourself the ability to undo them if you don't like them.

Warn before printing

One word of warning, however, if you hide the changes from view and save the document, anyone else working on the document can see them. To make sure you're warned about this so you know it is happening, choose Tools, Options, Security tab and enable the 'Warn before printing, saving or sending a file that contains tracked changes or comments' checkbox. Now, you'll be warned that changes exist before you save the document so you can make sure this is what you really mean to do.

By Helen Bradley

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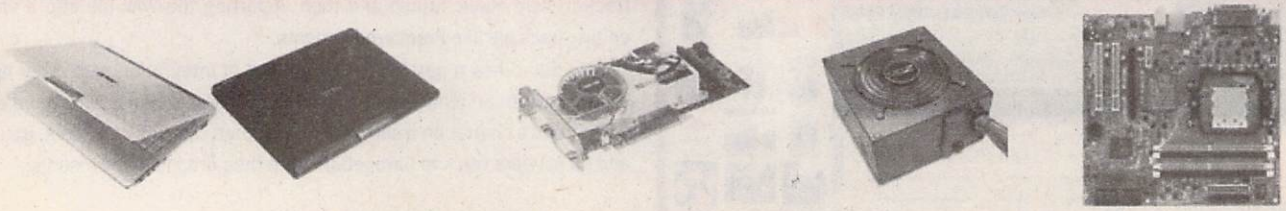

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Intel Pentium D 805 (Socket 775) 2.6Ghz/2Mb x64	see web
Intel Pentium D 915 (Socket 775) 3.2Ghz/4Mb x64	see web
Intel Pentium D 945 (Socket 775) 3.4Ghz/4Mb x64	see web
Intel Core 2 Duo E6300 (Socket 775) 1.86Ghz/1066Mhz	see web
Intel Core 2 Duo E6400 (Socket 775) 2.13Ghz/1066Mhz	see web
Intel Core 2 Duo E6600 (Socket 775) 2.40Ghz/1066Mhz	see web
Intel Core 2 Duo E6700 (Socket 775) 2.67Ghz/1066Mhz	see web
Intel Core 2 Duo Extreme X6800 (Socket 775) 2.9Ghz	see web

Full List of Processors Online

128 MB, SDRAM PC/133Mhz	see web
256 MB, SDRAM PC/133Mhz 8/16Chip	see web/see web
512 MB, SDRAM PC/133Mhz	see web
256 MB, DDR PC3200 (400Mhz)	see web
512 MB, DDR PC3200 (400Mhz)	see web
1 GB, DDR PC3200 (400Mhz)	see web
512 MB, DDR2 PC5400 (667Mhz)	see web
1 GB, DDR2 PC5400 (667Mhz)	see web
Corsair TWIN2X 2Gb PC5400 Dual Channel Kit	see web
Corsair TWIN2X 2Gb PC6400 Dual Channel Kit	see web
OCZ 2Gb PC5400 Special Opps Dual Channel Kit	see web
OCZ 2Gb PC6400 Special Opps Dual Channel Kit	see web

Full List of OCZ & Corsair Online

OCZ 1Gb Flash Memory, USB 2.0	see web
OCZ 2Gb Flash Memory, USB 2.0	see web
OCZ 4Gb Flash Memory, USB 2.0	see web
OCZ 1Gb Secure Digital Memory, 150x	see web
OCZ 2Gb Secure Digital Memory, 150x	see web
OCZ 4Gb Secure Digital Memory, 150x	see web

Flash and Brand Name Memory Also Available Online

Premier Cooling & Accessories

Antec 80mm Case Fans w/ Blue or Red or Green or Tri-Color LEDs	$9.99
Antec Hard Drive Cooler (Silver)	$24.99
Arctic Silver 5 Thermal Paste	$9.99
Arctic Cooling ATI Silencer 5 Rev. 2 VGA Cooler	$29.99
Arctic Cooling NV Silencer 5 Rev. 3 VGA Cooler	$29.99
Arctic Cooling Accelero X1 Nvidia VGA Cooler	$39.99
Arctic Cooling Accelero X2 ATI VGA Cooler	$39.99
Coolermaster Hyper 48 KHC-L91 Heat Sink & fan	$44.99
Coolermaster Aquagate Mini R120 Liquid Cooling System	$99.99
Thermaltake Blue Orb II Heat Pipe & Fan	$44.99
Thermaltake Big Typhoon Heat Pipe & Fan	$49.99
Thermaltake Silent 775 Heat Sink & Fan (Socket 775)	$39.99
Thermaltake Silent Boost RX K8 Heat Sink & Fan	$29.99
Thermaltake Fans 80mm / 90mm	$9.99/$9.99
Vantec Dual Fan Hard Drive Cooler	$14.99
Vantec ICEBURQ Copper VGA and Chipset Cooler	$14.99
Vantec Spectrum Fan Card (Blue)	$14.99
Vantec Stealth Case Fans 80mm/120mm	$9.99/$19.99
Zalman CNPS7000B-Cu Silent Copper Heat Sink & fan	$39.99
Zalman CNPS7700-Cu Silent Copper Heat Sink & fan	$44.99
Zalman CNPS9500 AM2 Silent Copper Heat Sink & fan	$69.99
Zalman VF700-Alcu Copper/Aluminum Videocard Heat Sink & fan	$29.99
Zalman VF900-CU Copper Videocard Heat Sink & fan	$44.99

Full List of Cooling Supplies Available Online

Vantec NexStar2 External 2.5in Enclosure, USB 2.0	$19.99
Vantec NexStar2 External 3.5in Enclosure, USB 2.0	$29.99
Vantec NexStar2 External 3.5in Enclosure, USB 2.0 & Firewire	$49.99
Vantec NexStar2 External 5.25in Enclosure, USB 2.0	$34.99
Vantec NexStar2 External 5.25in Enclosure, USB 2.0 & Firewire	$49.99
Vantec NexStar3 External 2.5in Enclosure, USB 2.0 & E-SATA	$29.99
Vantec NexStar3 External 3.5in Enclosure, USB 2.0 & E-SATA	$44.99
Vantec NexStar3 External 3.5in Enclosure, USB 2.0 & NAS	$74.99
Removable EIDE Hard Drive Rack w/ Fan (Black or Beige)	$14.99
Vantec Avox Jukebox Video/Audio/Photo Player/Enclosure (2.5")	$99.99
Altech MediaGate MG-35 Video/Audio/Photo Player (3.5")	$164.99

Premier Motherboards

Motherboards for AMD CPUs

Abit KN9 SLI, Socket AM2, nVidia 570SLI Chipset (ATX) SLI	$154.99
Abit KN9 Ultra, Socket AM2, MCP55 Ultra Chipset (ATX)	$129.99
Abit Fatality AN9 32X, Socket AM2, nVidia 570SLI Chipset (ATX)	$199.99
Asus K8V-X SE, Socket 754, K8T800 (ATX)	$59.99
Asus A8N-VM CSM, Socket 939, GeForce 6150 (mATX)	$89.99
Asus A8N-E, Socket 939, nForce4 Ultra (ATX)	$99.99
Asus A8N-SLI SE, Socket 939, nForce4 (ATX) SLI	$99.99
Asus A8N32-SLI Deluxe, Socket 939, nForce4 (ATX) SLI	$194.99
Asus A8R32-MVP Deluxe, Socket 939, ATI Crossfire (ATX)	$149.99
Asus Crosshair, Socket AM2, nForce 590 SLI MCP (ATX) SLI	$269.99
Asus M2NPV-VM, Socket AM2, nForce 6150 (mATX)	$99.99
Asus M2R32-MVP, Socket AM2, nForce 430 MCP (ATX)	$99.99
Asus M2N-E, Socket AM2, nForce 570 Ultra (ATX)	$114.99
Asus M2N-SLI Deluxe, Socket AM2, nForce 570 SLI (ATX)	$164.99
Asus M2N4-SLI Deluxe, Socket AM2, nForce 4 SLI (ATX)	$114.99
Asus M2N32-SLI Deluxe, Socket AM2, nForce 590 SLI MCP (ATX)	$229.99
Asus M2N32 WS Pro, Socket AM2, nForce 590 SLI MCP(ATX)	$339.99
Asus M2R32-MVP Deluxe, Socket AM2, ATI 3200 (ATX) Crossfire	$199.99
Asus M2V, Socket AM2, Via K8T890 (ATX)	$99.99
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Asrock 939Dual-VSTA, Socket 939, ULI 1695 (ATX) AGP & PCI-E	$84.99
Asrock 939SLI32-ESATA2, Socket 939, ULI 1695 (ATX) SLI	$99.99
ECS 761GX-M, Socket 754 (mATX) w/ Video, Sound & Lan	$59.99
ECS 761GX-M w/ XP2800+ CPU (mATX) w/ Video, Sound & Lan	$99.99
ECS C51GM-M, Sopket AM2 (mATX) w/ Video, Sound & Lan	$69.99
MSI K9N Neo-F, Socket AM2, nForce 550 (ATX)	$94.99
MSI K9N Platinum, Socket AM2, nForce 570Ultra (ATX)	$119.99
MSI K9N SLI Platinum, Socket AM2, nForce 570 SLI (ATX)	$159.99

Motherboards for Intel CPUs

Abit AB9, LGA775, Intel P965 (ATX) PCI-Express	$164.99
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Asus P5B, LGA775, Intel P965 (ATX) PCI-Express	$169.99
Asus P5B Deluxe, LGA775, Intel P965 (ATX) PCI-Express	$229.99
Asus P5PE-VM, LGA775, Intel 865G Chipset (mATX) AGP	$89.99
Asus P5P800-SE, LGA775, Intel 865PE Chipset (ATX)	$99.99
Asus P5LD2-VM, LGA775, Intel 945G (mATX) PCI Express	$124.99
Asus P5LD2, LGA775, Intel 945P (ATX) PCI Express	$124.99
Asus P5L-MX, LGA775, Intel 945G (mATX) PCI Express	$89.99
Asus P5N5LI, LGA775, nForce 570SLI (ATX) PCI Express, SLI	$129.99
Asus P5N32-SLI SE/Dlx, LGA775, nForce4 (ATX) PCI Express, SLI	$234.99
Asus P5W DH Deluxe, LGA775, Intel 975X (ATX) PCI-Express	$279.99
ECS P4M800Pro-M, Socket 775 (mATX) w/ Video, Sound & Lan	$59.99
ECS P4M800Pro-M478, Socket 478 (mATX) w/ Video, Sound & Lan	$54.99

Full List of Motherboards Available Online

Premier Videocards

AGP Videocards

Asus v9520-X/TD FX5200 w/ 128Mb (AGP) Video Out	$44.99
Asus Extreme N6800/TD w/ 512Mb (AGP) Video Out	$199.99
ATI Radeon X1300Pro w/ 256Mb (AGP) Video Out	$139.99
BFG 7600GS w/ 512Mb (AGP) Video Out	$174.99
Sapphire Radeon 7000 w/ 64Mb (AGP) Video Out	$34.99
Sapphire Radeon 9550 w/ 256Mb (AGP) Video Out	$59.99
Sapphire Radeon X1300 w/ 256Mb (AGP) Video Out	$99.99
Sapphire Radeon X1600Pro w/ 512Mb (AGP) Video Out	$164.99

PCI Express Videocards

Asus Extreme AX550SE/TD w/ 256Mb (PCI-E) Video Out	$89.99
Asus Extreme AX1600Pro/TD w/ 512Mb (PCI-E) Video Out	$124.99
Asus Extreme AX1600XT/Silent/TVD w/ 256Mb (PCI-E) Video In/Out	$174.99
Asus Extreme EN6200/TC w/ 256Mb TurboCache (PCI-E) Video Out	$49.99
Asus Extreme EN7300GT/TD Silent w/ 256Mb (PCI-E) Video Out	$109.99
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Asus Extreme EN7600GT/2DHT w/ 256Mb (PCI-E) Video Out	$214.99
Asus Extreme EN7600GT Silent 2DHT w/ 256Mb (PCI-E) Video Out	$234.99
Asus Extreme EN7900GT/2DHT w/ 256Mb (PCI-E) Video Out	$319.99
Asus Extreme EN7900GT TOP w/ 256Mb (PCI-E) Video Out	$359.99
Asus Extreme EN7950GX2/2PHT w/ 1Gb (PCI-E) Video Out	$674.99
ATI Radeon X1900XT w/ 512Mb (PCI-E) Video Out	$374.99
ATI Radeon X1900XTX w/ 512Mb (PCI-E) Video Out	$434.99
ATI Radeon X1950XTX w/ 512Mb (PCI-E) Video Out	$564.99
ATI Radeon X1900 Crossfire w/ 512Mb (PCI-E) Video Out	$444.99
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ATI All-In-Wonder 2006 Edition w/ 128Mb (PCI-E) TV Tuner	$159.99
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BFG GeForce 7300GS w/ 256Mb (PCI-E) Video Out	$84.99
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BFG GeForce 7900GT OC w/ 256Mb (PCI-E) Video Out	$328.99
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Sapphire X550 w/ 256Mb (PCI-E) Video Out	$64.99
Sapphire X1300 w/ 256Mb (PCI-E) Video Out	$79.99
Sapphire X1300 w/ 512Mb (PCI-E) Video Out	$104.99
Sapphire X1800Pro w/ 512Mb (PCI-E) Video Out	$134.99
Sapphire X1600XT Ultimate Edition w/ 256Mb (PCI-E)	$179.99
Sapphire X1900GT w/ 256Mb (PCI-E) Video Out	$239.99
Sapphire X1900XT w/ 512Mb (PCI-E) Video Out	$369.99
Sapphire X1900XTX w/ 512Mb (PCI-E) Video Out	$409.99
Sapphire X1950XTX w/ 512Mb (PCI-E) Video Out	$524.99

Full List of Video Cards Available Online

ATI TV Wonder 200 PCI - TV Tuner	$74.99
ATI TV Wonder 200 USB - TV Tuner	see web
ATI TV Wonder 650 - TV Tuner	see web
ATI HDTV Wonder - TV Tuner (Supports NTSC & ATSC)	$109.99
Leadtek WinFast TV 2000XP Expert - FM & TV Tuner	$54.99
Leadtek WinFast PVR2000 - TV Tuner	$124.99
PowerColor Theatre 550Pro Tuner - PCI Express	$89.99
Sapphire Theatrix Theatre 550Pro FM & TV Tuner w/ Remote	$89.99

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Maxtor 250GB ATA/133 7200RPM Hard Drive w/ 16Mb	$94.99
Maxtor 300GB ATA/133 7200RPM Hard Drive w/ 16Mb	$109.99
Maxtor 400GB ATA/133 7200RPM Hard Drive w/ 16Mb	$184.99
Maxtor 500GB ATA/133 7200RPM Hard Drive w/ 16Mb	$274.99
Seagate 80GB ATA/100 7200RPM Hard Drive w/ 2Mb	$49.99
Seagate 160GB ATA/100 7200RPM Hard Drive w/ 8Mb	$69.99
Seagate 250GB ATA/100 7200RPM Hard Drive w/ 8Mb	$84.99
Seagate 320GB ATA/100 7200RPM Hard Drive w/ 16Mb	$109.99
Seagate 400GB ATA/100 7200RPM Hard Drive w/ 16Mb	$174.99
Seagate 500GB ATA/100 7200RPM Hard Drive w/ 16Mb	$259.99
Seagate 750GB ATA/100 7200RPM Hard Drive w/ 16Mb	$399.99
WD 80GB ATA/100 7200RPM Hard Drive w/ 8Mb	$54.99
WD 120GB ATA/100 7200RPM Hard Drive w/ 8Mb	$69.99
WD 200GB ATA/100 7200RPM Hard Drive w/ 8Mb	$79.99
WD 250GB ATA/100 7200RPM Hard Drive w/ 8Mb	$89.99
WD 320GB ATA/100 7200RPM Hard Drive w/ 8Mb	$109.99

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Maxtor 160GB SATA/300 7200RPM Hard Drive w/ 8Mb	$69.99
Maxtor 200GB SATA/300 7200RPM Hard Drive w/ 8Mb	$84.99
Maxtor 250GB SATA/300 7200RPM Hard Drive w/ 16Mb	$94.99
Maxtor 320GB SATA/300 7200RPM Hard Drive w/ 16Mb	$114.99
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Maxtor 500GB SATA/300 7200RPM Hard Drive w/ 16Mb	$264.99
Seagate 80GB SATA/300 7200RPM Hard Drive w/ 8Mb	$59.99
Seagate 160GB SATA/300 7200RPM Hard Drive w/ 8Mb	$69.99
Seagate 200GB SATA/300 7200RPM Hard Drive w/ 8Mb	$79.99
Seagate 250GB SATA/300 7200RPM Hard Drive w/ 16Mb	$94.99
Seagate 320GB SATA/300 7200RPM Hard Drive w/ 16Mb	$114.99
Seagate 400GB SATA/300 7200RPM Hard Drive w/ 16Mb	$179.99
Seagate 500GB SATA/300 7200RPM Hard Drive w/ 16Mb	$249.99
Seagate 750GB SATA/300 7200RPM Hard Drive w/ 16Mb	$399.99
WD 36GB SATA/150 10000RPM Hard Drive w/ 16Mb	$129.99
WD 74GB SATA/150 10000RPM Hard Drive w/ 16Mb	$174.99
WD 150GB SATA/150 10000RPM Hard Drive w/ 16Mb	$259.99
WD 160GB SATA/300 7200RPM Hard Drive w/ 8Mb	$69.99
WD 200GB SATA/300 7200RPM Hard Drive w/ 8Mb	$79.99
WD 250GB SATA/300 7200RPM Hard Drive w/ 16Mb	$89.99
WD 320GB SATA/300 7200RPM Hard Drive w/ 16Mb	$114.99
WD 400GB SATA/300 7200RPM Hard Drive w/ 16Mb	$179.99
WD 400GB SATA/300 7200RPM Hard Drive w/ 16Mb (RE2)	$214.99
WD 500GB SATA/300 7200RPM Hard Drive w/ 16Mb	$244.99
WD 500GB SATA/300 7200RPM Hard Drive w/ 16Mb (RE2)	$259.99

Notebook Hard Disk Drives (2.5")

Samsung 40GB ATA 5400RPM Hard Drive w/ 8Mb	$59.99
Samsung 80GB ATA 5400RPM Hard Drive w/ 8Mb	$89.99

Full List of Hard Drive Brands Available Online

Mitsumi 1.44Mb Floppy Disk Drive (Black or Beige)	$9.99
Mitsumi 1.44Mb Floppy & 7-in-1 Card Reader (Black or Beige)	$24.99
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Promise Ultra/133 TX2 Controller Card	$54.99
Promise SATA2/300 TX4 Controller Card	$84.99
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Sony 52X CD-ROM Drives (Beige)	$19.99
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Full List of Drives Available Online

LG GSA-H10N (16x Dual Layer DVD±R/RW) (Beige/Black)	$34.99/$34.99
LG GSA-H10L (16x Lightscribe DVD±R/RW) (Beige/Black)	$39.99/$39.99
NEC 3550A (16x Dual Layer DVD±R/RW)(Beige/Black)	$39.99/$39.99
Pioneer DVR-111 (18x Dual Layer DVD±R/RW)(Beige/Black)	$39.99/$39.99
Plextor PX-760A (16x Dual Layer DVD±R/RW)(Beige/Black)	$114.99
Plextor PX-755SA (16x Dual Layer DVD±R/RW)(Serial-ATA)	$99.99
Sony DWQ120A (16x Dual Layer DVD±R/RW) (Beige/Black)	$39.99/$39.99

CD-R, CD-RW & DVD-/+R Media Available Online

Premier Soundcards

Soundblaster 16 Pre-Amp (PCI) (OEM)	$19.99
Soundblaster Audigy 4 SE (PCI) (OEM)	$49.99
Soundblaster Audigy X-Fi XtremeMusic (PCI) (Retail Box)	$124.99
Soundblaster Audigy X-Fi Platinum (PCI) (Retail Box)	$194.99
Soundblaster Audigy X-Fi Fatality FPS (PCI) (Retail Box)	$284.99
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Asus WL-138G Wireless-G Ethernet Adapter	$39.99
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NSpire Wireless-G PCI Ethernet Adapter	$24.99
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Linksys WMP54G - 802.11g Wireless Adapter PCI	$54.99
Linksys WPC54G - 802.11g Wireless Adapter PCMCIA	$54.99
Linksys WPC300N - 802.11n Wireless Adapter PCMCIA	$119.99
Linksys WUSB54G - 802.11g Wireless Adapter USB	$59.99

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D-Link DSL-300T xDSL Modem (Glite/G.dmt)	$79.99
Linksys BEFSR41 Cable/xDSL Router - 4 Port	$54.99
Linksys WRT54G Wireless 802.11g Router w/ 4 Port	$84.99
Linksys WRT54GL Wireless 802.11g Router w/ 4 Port (Linux)	$74.99
Linksys WRT300N Wireless 802.11n Router w/ 4 Port (Draft)	$149.99
Linksys WRV200 10/100 VPN Router w/ 4 Port	$79.99
Linksys RVS4000 10/100 VPN Router w/ 4 Port	$134.99

Premier Cases & Power Supplies

Economy Beige Mid Tower Case w/ 7 Drive Bays (ATX)	$24.99
Economy Black Mid Tower Case w/ 7 Drive Bays (ATX) (MC7799)	$39.99

Full Line of Thermaltake & LianLi Available Online

Antec NSK1300 Cube Case w/ 300W (mATX)	$109.99
Antec SLK1650 Mid-Tower w/ 350W (ATX) Beige	$89.99
Antec SLK1650B Mid-Tower w/ 350W (ATX) Black	$89.99
Antec SLK3000B Mid-Tower (ATX) Black	$84.99
Antec Sonata II Piano Black w/ 450W (ATX)	$134.99
Antec P160B Black Mid-Tower Case (ATX)	$164.99
Antec P180B Black Tower Case (ATX)	$159.99
Antec TX1050B Mid-Tower (ATX) Black	$54.99
Asus TA210 Black Tower Case (ATX)	$49.99
Asus TA5A1 Black Tower Case (ATX)	$149.99
Chenbro PC61169 Mid Tower Case (ATX) Beige	$54.99
Chenming M7601 Steel Case (ATX) Beige	$79.99
Enlight Mid Tower Case w/ 7 Bays (ATX) Beige/Black	$49.99/$54.99
Thermaltake Swing VB6000BWS Black ATX Case	$84.99
Thermaltake Viking VA4000BWS Black ATX Case	$94.99
Thermaltake Soprano VB1000BWS Black ATX Case	$99.99
Thermaltake Mozart VC4000SNS Silver ATX Desktop Case	$134.99
Thermaltake Tsurami Dream VA3000BWA Black ATX Case	$134.99
Thermaltake Tsunami Dream VA3000SWA Silver ATX Case	$134.99
Thermaltake Thermalrock Circle Black ATX Case	$144.99
Thermaltake Thermalrock Dragon Black ATX Case	$139.99
Thermaltake Armor VA8000BWS Black ATX Case	$174.99
Thermaltake Shark VA7000SWA Silver ATX Case	$174.99
LianLi PC-60A Plus II Aluminum Case (ATX)	$164.99
LianLi PC-60B Plus II Aluminum Case (ATX)	$164.99

250W - 600W Power Supplies Available Online

Economy 250W ATX Power Supply	$24.99
Enlight 350W Power Supply	$

DV, or Not DV

Sound's Important – Everywhere!

Digital Audio Editing, Part 1

Samsung's new portable MP3 player turns the world of digital audio on its ear – literally. The new K5 flash memory-based player features built-in slide-out audio speakers.

No longer limited to the world of teeny, tiny earbuds, portable MP3 players can now be heard clearly and plainly not just by the wearer, but by anyone standing nearby. That's the point!

So there's no better time to learn about editing digital audio. Today, you can never tell who's gonna hear your personal song list, your own mash-ups, your selection of samples or your very own podcast.

In Part 1, we'll look at the hardware side of digital audio. Next time, we'll review some great new audio editing software.

There are stand-alone digital audio workstations (DAWs), as well as individual hardware and software solutions for the PC; they come in a wide variety of shapes, sizes, flavours and prices.

Almost any computer today comes with the basics: a set of internal or external speakers, coupled with a sound card of some sort. As long as your computer's sound card has input connections, you can play your analog or digital field recordings into your computer, save them as computer audio files and edit them in digital form.

A basic sound card (or digital video capture card) isn't the only way to get audio into a PC. There's a whack of stand-alone, external USB- or FireWire-equipped audio input devices out there. You plug one end of the device into a USB/FireWire port, your external audio source into the other, fire it up and off you go.

(For more information about digital audio products, see DV or Not DV #2 - The Value of Analog; and DV or Not DV #6 - Getting in Sync with Home Editing – both archived at www.hubcanada.com)

Of course, not all sound cards and audio input devices are alike. While top-notch professional products can cost up to $10,000 – you might meet your needs for thirty bucks.

To differentiate among them, understand that most basic sound cards are a printed circuit board, onto which four basic components are embedded:

- an analog-to-digital converter (ADC)
- a digital-to-analog converter (DAC)
- an ISA, PCI or PCI Express interface to connect the card to the motherboard
- Input and output connections for external devices, microphones and speakers

Instead of separate ADCs and DACs, some sound cards use a coder/decoder chip, also called a codec, to perform both functions. To translate incoming analog sound waves to digital bits and bytes, the conversion process samples – or digitizes – the sound by taking precise measurements at frequent intervals. That's called the sampling rate, and it's measured in kHz. The higher the number, the faster the sampling rate, the more fidelity the reconstructed sound will have.

Think of it as dipping an empty cup into a flowing river. The deeper you reach, the more often you dip, the better and more accurate your samples of the water will be.

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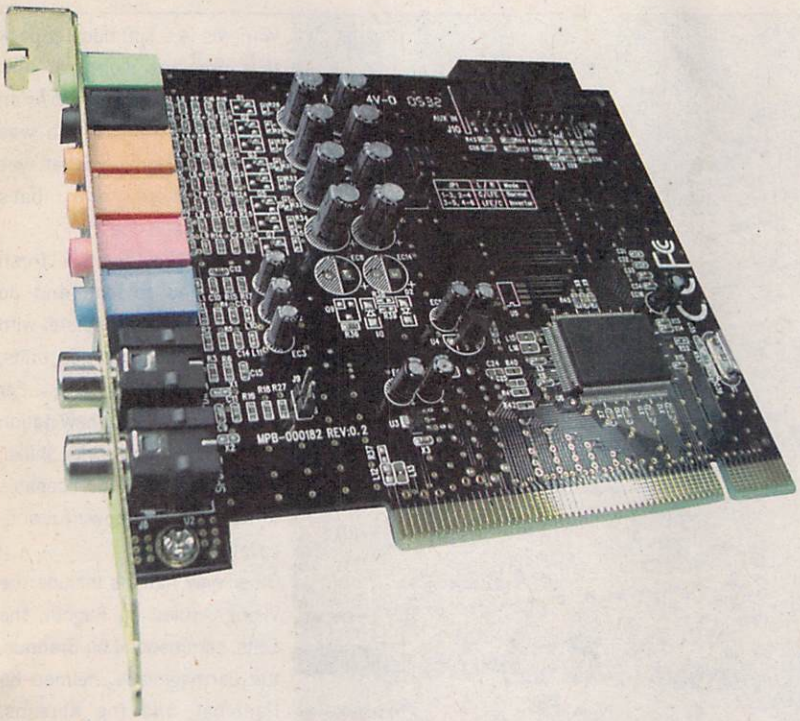

In addition to the basic components needed for sound processing, many sound cards include additional hardware or input/output connections, including:

Digital Signal Processor (DSP): A special microprocessor that takes some of the workload off the computer's CPU by performing calculations for analog and digital conversion. Sound cards that do not have their own DSP use the CPU for processing.

Memory: Like a graphics card, a sound card can use its own memory to provide faster data processing.

Input and Output Connections: Sound cards should have connections for a microphone and speakers, which can include stereo mini-plugs, RCA connections, quarter-inch phone, S/PDIF (a digital interface from Sony/Philips) and/or MIDI, the Musical Instrument Digital Interface.

If you're going for a top-of-the-line sound card, check the specs, but also make sure you have high-quality speakers that match.

As far as the computer itself, although in many cases it is possible to record audio to the same drive as the one running the operating system and audio application, you'll probably get better performance by recording to a separate drive.

Audio eats up a lot of space – nowhere near the amount that video does – but even the smaller drives today will be hard to fill with audio files alone. Extra drive space (internal, via EIDE or better; external via USB or FireWire) can always be added. Some audio editing programs or hardware accelerators do look for a minimum drive rotation speed (7200 RPM should do it;,and the Oxford 911 or 922 bridge is nice), so always check your gear first to meet certain specs.

Desktop or notebook computers can be used, but remember that along with the digital media system specs, RAM is very important, and more is almost always better. I wouldn't try running an audio program under Windows XP or Mac OS X on less than 512MB; 1GB is nice.

Most users agree that separate sound cards – or dedicated external devices – provide better audio quality, so when sound is important, pay heed to the experts, and listen up!

By Lee Rickwood

Lee Rickwood is a freelance writer and independent video producer. He operates Word On A Wire, an independent company providing editorial, media production and consulting services to individuals and companies across North America. He can be reached at videodaze@goodmedia.com.

But even high sampling rates result in some sound quality degradation. Just the physical process of moving sound through wires can cause distortion. Two measurements are used to quantify this reduction in sound quality: Total Harmonic Distortion (THD), expressed as a percentage, and Signal-to-Noise Ratio (SNR), measured in decibels.

In both cases, smaller indicates better. So there are ways to measure, compare and differentiate among the many sound cards available on the market (see chart on page BC 38).

In most cases, if you're making CDs or preparing audio for Web streaming or podcasts, analog to digital transfers should be done at least a CD quality: 16 bit/44.1kHz stereo. Be sure your sound card/input device can do analog-to-digital transfers at that rate.

Using two channels stereo and 16 bit sampling at 44.1 KHz, the bit stream – and therefore the approximate file size, storage requirements and download times – can be calculated:

Two audio channels x 16 bit x 44,100 samples per second = 176,400 bytes per second (8 bits make one byte), so approximate sampled stereo audio file sizes by length are:

One minute– 10 MB, one hour– 605 MB, 74 min– 746 MB

Good	Better	Best
THD : <0.5%	THD : <0.05%	THD : <0.01%
SNR : >75dB	SNR : >90dB	SNR : >100dB
Freq : 20Hz-20kHz, +1/-1dB	Freq : 20Hz-20kHz, +0.5/-0.5dB	Freq : <10hz-46khz, +0.05/-0.1d

Sid Meier's Civilization IV: Warlords

Warlords is a $30 booster pack that provides plenty of new content for Civilization IV. As an expansion, Warlords job was simply to augment what was already there, and that's exactly what it does.

Warlords provides six fresh civilizations to lead and do battle against, complete with famous leaders, unique units, and novel Wonders. For example the Zulu, a new nation led by the fierce warrior Shaka, is the only civilization capable of training Impi; powerful anti-cavalry soldiers.

Other new nations include the Vikings, ruled by Ragnar, the Celts, commanded by Brennus, the Carthaginians, helmed by Hannibal, and the Koreans, stewarded by Wang Kon. New leaders have also been provided for a few of Civilization IV's existing nations.

There are also a variety of original units and structures, including trebuchets (an artillery unit similar to a catapult), stables that provide experience to mounted units, and Great Generals, who spawn sporadically and come with special powers, such as the ability to build a military academy or join forces with and greatly strengthen other units.

There are also fresh Wonders in the game, the most noteworthy of which is the Great Wall. The first civilization to research the Great Wall gains the advantage of having a wall built around the borders of their kingdom.

However, the Great Wall aside, most of the new additions are a bit like a new coat of paint – they look nice but they don't change the underlying game play. The expansion's real worth lies in its eight new scenarios, a few of which manage to (gently) shake up the Civilization formula.

A case in point is the Barbarian Horde scenario, which allows players to command those pesky brutes who often plague fledgling civilizations. Rather than taking over towns and cities, the barbarians' goal is simply to destroy everything they can – a civilization antithesis, if you will.

Another interesting scenario is Omens, where players command either the British or the French in a battle for North America. The key to this war has to do with religion. Both commanders are working at the behest of a divine entity, and if this spiritual figure is unhappy with your actions it will smite your own people. We're talking a serious Old Testament smack down.

In the end, Warlords may not be an earth shattering expansion, but at the very least it's a good excuse to revisit a great strategy game worthy of a few dozen more hours of our time.

By Chad Sapieha

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CivCity: Rome

City building games blew many-a-mind when they arrived last century. Gamers loved the idea of being able to plan a city from scratch, fussing over the details of residential areas, commercial districts, and the roads that connect them. But the genre hasn't really done all that much to hold our interest over the past few years, and, sadly, CivCity: Rome does little more than maintain the status quo.

Taking on the role of a talented Roman governor, players are tasked to build or look after a variety of cities with strategic importance to the empire. You may need to start a town from scratch to collect resources like stone or wine for larger cities, or perhaps redevelop an existing city to make it more efficient.

Virtually all of your tasks revolve around your citizens. You need to keep them happy so they stay in the city and work. You also have to ensure that they make decent livings so that they can afford to pay the taxes that keep the public coffers full. This is done by building wells, providing them with clothes, keeping them fed, ensuring that there are plenty of work opportunities, and providing luxuries such as bath houses, gardens, and philosophy.

The trick is to make sure your people live close enough to the things they need. If they're too far from a temple, they won't get their dose of religion. If they don't live close enough to a well, they won't have access to water.

As the game goes on your citizens' needs will fluctuate as people come and leave the city, or uncontrollable factors – like roaming wild animals – come into play. These events force the player to abandon planning activities and enter maintenance mode. For example, you may be forced to suddenly erect a series of fire towers to ensure an encroaching brush blaze doesn't destroy your buildings. Needless to say, these ad hoc game events often play havoc with a city's design.

The best thing CivCity has going for it is its presentation. The AI at work is really quite remarkable Larger cities will have hundreds of citizens going about their daily lives, and taking the time to watch what they're doing can prove both entertaining and enlightening.

At one point I decided to stop what I was doing and just watch a carpenter. He'd get his wood from the mill and begin creating beds before selling them to needy citizens. All of his actions made perfect sense, from crafting the product to selling it to lugging overflow to a warehouse for storage.

And the game runs buttery smooth. No matter how big my cities grew, the frame rate almost never faltered. Granted, I was running CivCity on a tricked out gaming rig (see system specs above) for the most part, but I also tried it on a couple of laptops that weren't designed explicitly with gaming in mind and, though there was a slight dip in performance, it was still very playable on high graphics settings.

However, taken as a whole CivCity: Rome is pretty standard fare. Fans of city builders will likely find a moderate level of entertainment, but at the end of the day they'll feel as though they've seen it all before.

By Chad Sapieha

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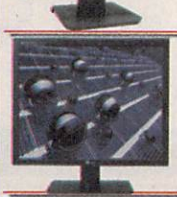

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Photography Tutorial: Know thy ISO

Adventures in lower light

When you go to a game or event held in a large stadium, you invariably see little blinks of light going off all over in the stands – people taking pics of their favourite player or rock star with the camera flash turned on. The sad fact is that the flash unit built into a digital camera is far too small to have any effect when you are a few hundred metres from your subject. Cameras will list the effectiveness of the flash as a distance range, for example one to five metres, or more precisely using a guide number-based figure such as GN = five metres at ISO100. In both cases, you get an inkling of the outer limits of the flash's performance. Suppose it's three metres. You'd have to be right on the playing field for the flash to be fully effective.

The ISO designation, which is a rating of light sensitivity, holds a solution, however. With film the ISO rating is an inherent part of the formulation, so an ISO800 film (often referred to as a fast film) is more sensitive to light than an ISO100 film, and thus better able to capture images in dark environments. Digital cameras have adopted that same ISO system, but since they don't use film, the variable sensitivity is accomplished electronically by amplifying the signal.

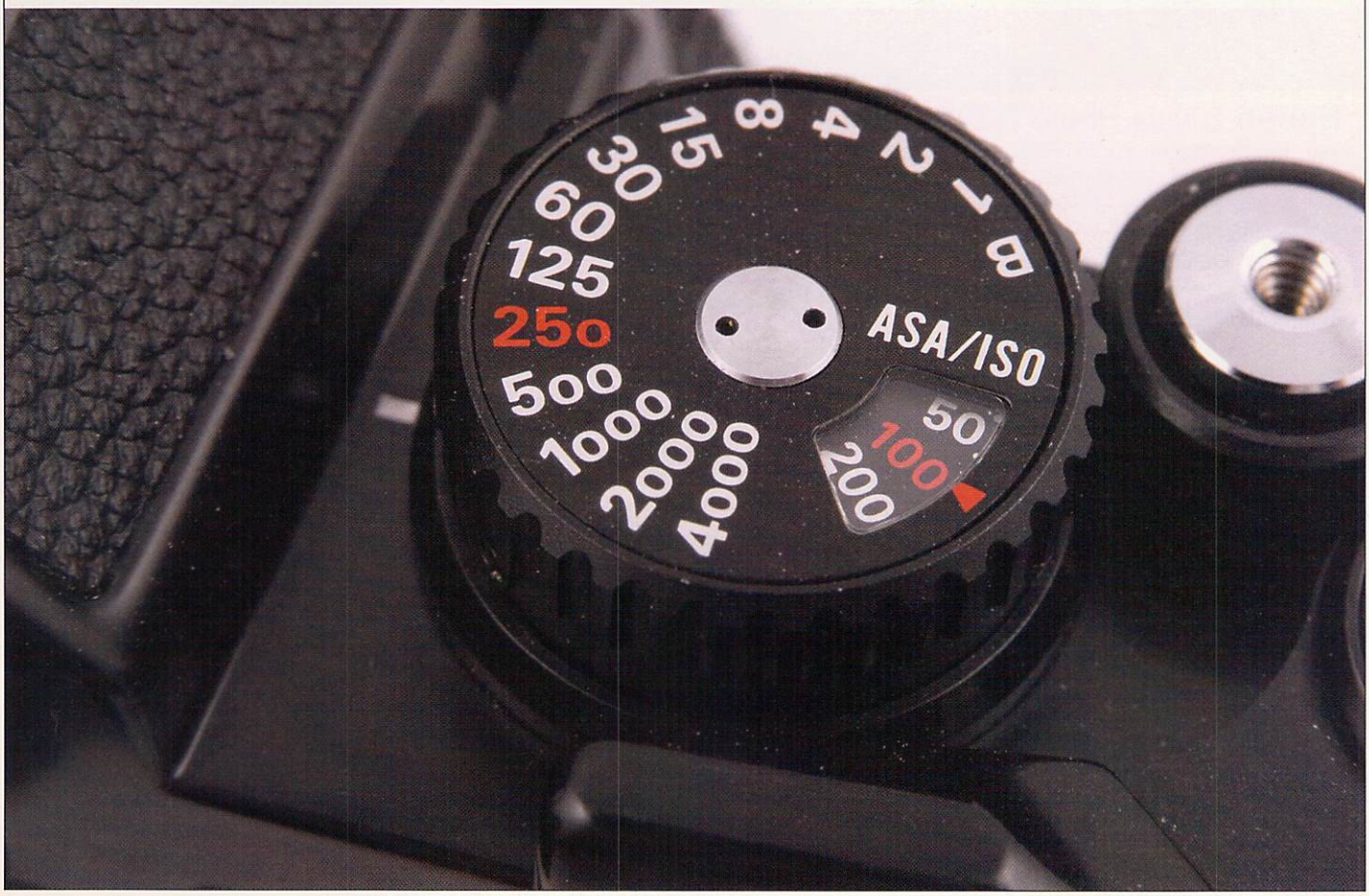
A basic relationship in electronics is that as you amplify a signal, you also amplify noise. Think of what happens when you turn up your radio for a weak station. You can hear the programming better, but the static and other audio junk get louder too. Similarly, when you select a higher ISO, the level of visual noise increases too, and that shows up usually as random mis-coloured pixels that degrade image quality.

With early digital cameras this was a big problem, and photos taken at high ISO were seriously lame. Today, most camera makers have high ISO noise better controlled, and some now offer cameras with ISO ratings as high as 3200, which is quite impressive. This reduces the need for a flash considerably or makes it more effective over a longer distance.

Even when lighting is adequate, high ISO delivered cleanly has a couple of other benefits: you can use a faster shutter speed (less blur and better stop-action photos) or a smaller aperture (to put more of the scene into sharp focus). Some camera makers implement a kind of image stabilization that's based on jacking up the ISO and using a faster shutter speed. It's not true optical image stabilization but it works to a degree because higher shutter speeds stop motion better, whether the motion is in the scene or induced by an unsteady hand holding the camera.

When you set your camera to Auto, the camera will vary ISO, aperture and shutter speed to create the best exposure setting. If your camera's high ISO performance isn't so good, you may be blaming the camera for mediocre pictures when it's really just one part that's the culprit. One way to test this is to set the ISO manually to the highest setting and take a bunch of pictures; then set the camera at the lowest ISO and take some more pictures under similar conditions; and then compare the two batches. If the photos taken at low ISO are noticeably better, you have a fix readily at hand – take the camera off Auto and set the ISO manually to a lower number.

By David Tanaka



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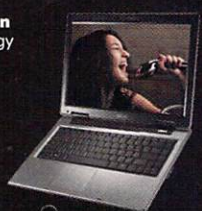

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